Minutes of the HSC section

23rd meeting on Wednesday 17/09/2014 (09:00, 6/R-012)

HSC members: Olav Berrig (OB), Christian Carli (CC), Elias Metral (EM), Giovanni Rumolo (GR), Frank Schmidt (FS), Elena Wildner (EW), Elena Benedetto (EB), Michael Bodendorfer (MB), Kevin Li (KL), Tatiana Pieloni (TP), Benoit Salvant (BS), Guido Sterbini (GS), Daria Astapovych (DA), Adriano Garonna (AG), Meghan McAteer (MM), Nicolas Mounet (NM), Carlo Zannini (CZ), Nicolaio Biancacci (NB), Xavier Buffat (XB), Alexander Huschauer (AH), Giovanni Iadarola (GI), Adrian Oeftiger (AO), Serena Persichelli (SP), Tatiana Rijoff (TR), Letizia Ventura (LV), Claudia Tambasco (CT), Magdalena Kowalska (MK), Andrea Passarelli (AP), Annalisa Romano (AR), Michael Schenk (MS), Vincenzo Forte (VF), Danilo Banfi (DB), Javier Barranco (JB), Joseph Kuczerowski (JK).


1) Newcomers / visitors
- None.

2) Comments on the minutes of the previous 21st and 22nd meeting + Actions
- None.

3) General infos
- No particular comment from anyone.
- SL meeting:
  - No SLM last week.
- Reminder of the CST expertise in our section (impedance team) => https://espace.cern.ch/be-dep/ABP/HSC/Meetings/IMG_3194.JPG.
- Any fellow request? Deadline today.
- LNI (Learning Needs Inventory) => Team informed and answers requested before 01/10/14.

- Discussion with MauroM about the music code => Possible next steps:
  - Beta < 1.
  - Transverse plane.
  
  => In the list of future activities for the HTDWG.

- HSS meeting on Monday and talk from RiccardoDM about LHC tunes at injection => Can we explain this picture ([https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Screen%20Shot%202014-09-17%20at%2015.53.21.png](https://espace.cern.ch/be-dep/ABP/HSC/Meetings/Screen%20Shot%202014-09-17%20at%2015.53.21.png))? => Huge (~ 1E-2) tune variation inside the 4 SPS batches of a LHC batch…

- Discussion with TatianaP about some remaining BB questions:
  - Stability diagram: PACMAN LOF > 0 vs. NOMINAL LOF < 0.
  - BTF => Show predictions for LHC and when to measure, how, etc.
  - Use of margins.
  - Plot of the coherent tunes (BB and imp.) on the 2012 stability diagram (and on the 2015 one).
  - Etc.

- Ecloud meeting:
  - Rehearsal from LottaM for her talk next week at the 4th Low Emittance Rings Workshop (LOWεRING 2014) organized by the INFN at LNF, Frascati.
  - 2011-2012 head load analysis of the IT and SAM by Johannes Hulsman => Very interesting to see that for the SAM there was no ecloud => When did the scrubbing happen? Look now at 2010 data…

- FCC-hh meeting on potential site extension for FCC and requests from experiments.

- PS-LIU: SimoneG made a brief summary of the Finemet review last week => SimoneG mentioned in particular that the reviewers were impressed by the talks from SerenaP and LetiziaV (congratulations!).

4) Brief reports for the different machines
- PSB (ElenaB)

Nothing special to report, apart from a few timing issues (e.g. on the Ring1 horizontal shavers) which were promptly solved.

Concerning the beams:

- ISOLDE : more than 3000e10 p with balanced bunches.

- SFTPRO2: 500e10p in all rings but ring4 (450e10), but the beam has been noted to be de-bunched on certain shots and will have to be improved.

- LHC25ns and 50ns: in a reasonable good shape (priority this week was on SFTPRO)

Vincenzo Forte made first tune scans for resonance identification and has some preliminary results. He will continue this week.

- PS (GuidoS)

In vacation.

- SPS (BenoitS)

The main issue during the past week was the replacement of a water cooled cable, feeding the QD circuit in BA3. The cable was replaced by two warm cables (400mm2 each). The work took three full days, from Wednesday to Friday evening. On Friday we resumed the preparation of the SPS to take beam. We lost several hours trying to undo the different safety modifications in the main power convertors (ground rods, door switches, stop buttons), which were implemented to allow the work on the cable. The first line intervention was not instructed on these procedure and all the experts were gone. Unfortunately there was a spark on the MKD just before we were ready and the kicker had to be reconditioned.

Finally we managed take beam at around 4 ‘o clock on Saturday morning. The FT beam went immediately down TT10 and it was not too difficult to make it circulate in the SPS. With the help of Thomas Bohl we managed to capture and accelerate the FT beam on Saturday. On Sunday the 25nsec beam, 12 bunches, was injected and accelerated, again with the excellent help of RF experts. Today the plan is to work on the BPM’s in order to get the best quality for the beam based alignment.

- LHC (EliasM)

Nothing particular to mention. Ongoing discussions for Chamonix workshop next week.

- LEIR (MichaelB)

The week was short due to Jeune Genevois and the potential bridge-friday.

Tuesday, Sept. 9th: Investigation is ongoing about ripples on main quadrupole power supplies. Marc Magrans leads the investigation. He discovers that the front end of ER.QDN2040 is permanently down and needs replacing.
Friday, Sept. 12th: Beam is back in LEIR. We measure on ETP.BCT10 (towards the PS): maximum 1.2E10 charges per bunch. Note: LEIR operates in Argon beam with H1 -> one single bunch per extraction (unlike with Pb54 where it extracted two bunches in NOMINAL (H2) and one bunch in EARLY (H1)). Accumulated intensity is 2.1E10 charges in LEIR right after the (single) 200 micro-second multi-turn injection.

Saturday, Sept. 13th: The Low Level Digital RF server crashed. Resetting the server brought back beam in LEIR. This server has been exchanged in August. The new server is in focus to see whether it features a higher level of run time stability compared to the old server.

Sunday, Sept 14th: since Saturday, uninterrupted LEIR performance. Extracted beam intensity is stable at avg. 0.9E10 charges with a standard deviation of 0.11E10 charges (>10000 samples).

Linac3 delivered intensity to LEIR: standard deviation = 9.6%

LEIR extracted intensity: standard deviation = 15%

Monday, Sept. 15th: Low Level Digital RF server crashed again. Rebooting brought back ion beam in LEIR. ETP.BCT is not showing any current, although PS confirms the reception of 0.4E10 charges per bunch. Strong ripples on ER.BHN in OASIS observed. This was seen beforehand and it was linked to a non-reproducible machine behavior.

Night from Monday to Tuesday: RF capture not working. Restart of the respective server did not resolve the situation.

Tuesday: switching off the Transverse-Feedback-Damper will save the beam from injection to RF capture. But then, at RF capture, the beam is lost due to a disfunctionality in the RF system. Later-on during Tuesday, RF is back on and beam is accelerated and sent to the PS. PS is not injecting the ion beam due to a mismatch in timing.

Plan for this week: we will try to reconfigure LEIR from the bare machine in order to obtain a working control system hierarchy.

Conclusion of this week: The transverse-damper is (again) at the focus of problem solving.

5) Discussions about the talks (and main messages) to be given at next week Chamonix workshop (all the speakers: BenoitS, GiovanniR, GianniI, HannesB and MichaelB)

Many interesting information in these very nice talks!

MichaelB discussed in particular the concept of ultimate integrated luminosity. JohnJ added after the meeting that “the integrated luminosity in a fill is bounded by the ultimate integrated luminosity, which is independent of things like beta* and it is linear in the number of particles in one of the beams (the 2013 p-Pb run was a very striking example!). It is discussed in http://accelconf.web.cern.ch/AccelConf/IPAC2014/papers/tupro013.pdf, where we also introduced the luminous efficiency (see Eq. 1 and paragraph following). Because of the very strong burn-off in Pb-Pb collisions we expect very short fills and the luminous efficiency to go
up to ~60% at HL-LHC. That’s why we emphasise this performance measure. A stochastic cooling system is the ultimate luminosity upgrade for a hadron collider in the sense that it allows you to approach the ultimate luminosity in a reasonable time (and no need for all the trouble over beta*, etc ! ). Without a cooling system this can take an “infinite” time. At RHIC, they even used this relation (and cooling) to measure the U-U cross-section.”

=> This can be seen indeed from the very definition of the lumi (as Michael mentioned): see for instance slide 4 of http://emetral.web.cern.ch/emetral/Lund2013Course/Lumi_AcceleratorCourse_Lund2013_EM.pdf.

6) (Ongoing) discussion on how to use the LHC (possible aperture) margins in 2015 (TatianaP and EliasM)

- No time to cover it => Some slides here: https://espace.cern.ch/be-dep/ABP/HSC/Meetings/FollowUpLMC_SummaryMargins.pdf.

7) Actions to be taken for the next meeting

- List of all actions: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/Actions.aspx.

8) Miscellaneous

- The next (24th) meeting will take place on 01/10/2014 => Agenda:

  1) General info and follow-up (EliasM)

  2) Reports for the different machines (PSB, PS, SPS, LHC and LEIR)

  3) Highlights and follow-up of the Chamonix workshop (EliasM et al.)

  4) AOB (EliasM)

- Important events and dates for HSC: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/EventsAndDates.aspx.

- Preliminary agendas for the next meetings: https://espace.cern.ch/be-dep/ABP/HSC/SitePages/MinutesOfMeetings.aspx.


Minutes by E. Metral, 17/09/2014.